5. LIVESTOCK COMPLEXES IN LATE COLONIAL PERU AND NEW SPAIN: AN ATTEMPT AT COMPARISON

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In 1817 the Secretary of the Consulado of Veracruz, José Maria Quirós, presented his crude yet novel attempt to calculate the annual value of New Spain's production and services, or in modern terminology the viceroyalty's GNP, for the last years before the outbreak of the Wars of Independence. It is an impressive testimony to the great economic significance of livestock raising during that period. Quirós estimated the value of cattle marketed annually to equal the value of both maize and wheat production. Hogs, so tells us the author, contributed as much to Mexico's GNP as the domestic consumption of sugar and associated products. In all, primary livestock products were estimated to account for more than 56 percent of the viceroyalty's domestically consumed agrarian production and about 30 percent of the total GNP.[1]

Even if Quirós' figures were inflated, there can be little doubt that livestock production played a vital role for the economies of Mexico as well as Peru during the half century or so before the close of the colonial era. For the historian, analysis of this economic sector is at once rewarding and difficult because of the multiple functions and correspondingly varied structures of livestock procuction: It served transport (mules, horses, donkeys, llamas), provided draft power for agriculture and industry (oxen, mules and donkeys), supplied raw materials for a wide range of industries (cattle, sheep, goats and cameloids) and contributed much to food production (cattle, hogs, sheep). This multifunctionality of livestock complexes lends their analysis significance not only in their own right but also because of the strong linkages to other sectors and the consequent diagnostic value livestock production holds for such problems as the evolution of various industries, productivity in the agricultural sector and income distribution, as reflected in dietary patterns.

This paper will attempt to draw out similarities and differences between the structure of production, markets and the conjuncture for livestock goods in Mexico and Peru during the late colonial period. I will suggest that both the ecology and the pre-hispanic settlement and land-use patterns in Mesoamerica and the central Andean region con-

stitute important factors in explaining why by the eighteenth century the social distribution of livestock property differed markedly between the two viceroyalties: In New Spain production units especially of sheep but also of cattle tended to be larger and the role which the Indian peasantry could play in this sector more limited. In late colonial Peru, on the other hand, the Andean peasantry still held a major share of the region's livestock population, and livestock estates of creole or peninsular Spaniards on the average were smaller – both in area and in livestock capital – than those in New Spain. At the same time prevailing technologies for raising sheep, cattle and other domesticated animals remained similarly tradition bound in both viceroyalties. Yet during the eighteenth century the commercialization process and the market structure for livestock products evinced a greater degree of complexity and integration in the northern viceroyalty than in Peru. This at once contributed to and reflected broader divergent developments in the demographic and economic structures of both viceroyalties during the late colonial period.

I. Ecology and Early Colonial Development

Ecological factors and patterns of human settlement and land-use determined a divergent development of livestock populations since the early days of conquest in Mexico and Peru.

Most of Mexico's greatly varying ecological regions offered propitious conditions for livestock. The plains of the central and northern *mesetas* contained large expanses of semi-arrid grasslands which without irrigation were not apt for crop agriculture. The lush piedmont of the eastern and western Sierra Madre, falling off to the Gulf of Mexico and the Pacific Ocean, offered rich grazing lands, as for example in the Huasteca and the Pacific slopes of Nueva Galicia. Even parts of the southern highlands, with their steeply sloped valleys and narrow ridges, as the Mixteca Alta and the Oaxaca valley system, offered greater potential for livestock grazing than for crop agriculture. It is ironic that inspite of these favorable habitats, pre-hispanic Mesoamerica counted with very few species of large mammals and the Amerindian cultures knew no other domesticated animals than dogs and fowl. Thus much grassland remained untouched until 1519 and the sedentary Amerindian societies largely limited themselves to crop agriculture in the fertile highland basins, river valleys and tropical lowland areas of central and southern Mexico.[2] This settlement pattern was to have great significance

for the location and social structure of livestock complexes.

The ecology of the central Andean region placed greater restriction on the spread of newly introduced domesticated animals. The arid Pacific coast offered sufficient vegetation – other than the seasonal verdure of the *lomas*, or piedmont hills – only in the fertile, narrow river valleys. These had been the site of complex irrigation systems for crop agriculture sustaining large sedentary populations. To the east of the Andes the tropical rainforest of the Amazon lowlands without modern veterinary practices were not propitious for livestock raising. The slopes, valleys and high plateaus of the Andes, on the other hand, provided large areas of grassland. Indeed it was here that the only large domesticated animals of pre-hispanic America, the various cameloid species, such as alpacas, llamas and huanacos, were raised. Thus, in contrast to Mesoamerica, no major regions of virgin grassland existed at the moment of the Spanish conquest. The high plains best suited to maintain large herds of animals, such as the Titicaca basin and the plains of Junin, were densely populated with highly stratified sedentary populations, whose agrarian society rested on a regionally differentiated mixed economy of crop cultivation and livestock raising.[3]

The story of the rapid propagation of nearly all types of European domestic animals in sixteenth century Mexico is well known. During the first half-century after conquest horses and cattle propagated at an unprecedented rate in most ecological zones of the viceroyalty, from the humid Gulf coast to the central plateau and the northern plains, particularly in the area of Durango and Nombre de Dios. By the 1560's literally millions of these animals roamed the virgin grasslands of the colony in a semi-wild state. Sheep, uncapable of fending for themselves, followed rather than preceded the advance of colonial settlements. While also spreading rapidly until the mid-sixteenth century in the higher regions of southern and central Mexico as far north as Querétaro and Aguascalientes, they only began to flow into the vast northern plains of Nuevo León and Coahuila since the last decades of the century.[4] Nearly from the very beginning livestock raising in New Spain was dominated by very large production units. In 1598, for example, Rodrigo de Rio de Losa in one year alone is reported to have marketed 60,000 head of cattle from his Hacienda Santiago near Somberete in distant Mexico City.[5] Since the 1570's New Spain's livestock populations, especially that of cattle, quite suddenly began to decline due to wasteful and uncontrolled overkilling, rustling and Chichimec raids and, most importantly, a decline in livestock fertility at least in the central and

southern regions.[6] During the mid - sixteenth century public authorities were only concerned about devastating effects of proliferating herds of cattle, horses and sheep on food crop production and Indian population.[7] Since the 1570's, however, measures for the protection and regulation of livestock raising concerning such things as slaughter, sheepwalks and limitations of abusive treatment of ranchers by local officials were put into effect.[8]

During the following century livestock raising in New Spain, parallel to the process of hacienda formation, became a more organized enterprise, a certain balance with crop production was reached and the locational pattern of livestock populations which, *grosso modo,* was to prevail until the end of the colonial era was established. Sheep flocks were concentrated east and north of the viceregal capital in a belt stretching from Tlaxcala via Pachuca, Cadereita, Querétaro to San Miguel el Grande and Aguascalientes; and in the far north in Nuevo León and Coahuila, with minor populations in some southern areas as the Mixteca Alta and the Oaxaca valley system. Cattle was spread more evenly throughout much of colonial New Spain, but important concentrations were discernible in modern - day Jalisco, Michoacán, and the Gulf coast north of Veracruz.

Also in the Andean region European livestock species spread rapidly since the 1530's, albeit on a smaller scale than in Mexico.[9] On the coast the propagation of cattle, hogs, goats and, to a lesser extent, sheep and horses, combined with the reduction of the Indian population to lead to a changed land - use pattern in the fertile irrigated river valleys, which in pre - hispanic times had only hosted limited flocks of llamas for the transport of guano. Now the more marginal lands ceased to be used for crop raising and reverted to grass and carob tree vegetation on which the growing livestock populations fed. While these early coastal herds also primarily belonged to Spanish colonists, they were of very modest size indeed compared with those of New Spain's early colonial cattle barons.[10] With the growing demand for foodstuff in the urban centers of coastal Peru and the opening of markets for products such as sugar, wine and *aguardiente* up and down the Pacific coast from Mexico to Chile, the seventeenth century witnessed a renewed dedication of most Peruvian coastal valley lands to food and commercial crops. From then until quite recently livestock raising was mostly limited to goats and mules in the extreme north, hogs in the immediate vecinity of major urban markets, as well as the maintenance of alfalfa fields for transport and draft animals, which were acquired, together with the cattle and

sheep for meat consumption, either in the Sierra or from Tucumán.[11]

The introduction of European livestock species in highland Peru had different implications due to the previous existence of large herds of domesticated animals there. Proliferation of cattle and sheep thus in the Andes did not primarily diminish crop fields – the extent to which it did that still requires further analysis –, but rather led to the displacement of cameloid herds, a long-term process which continued at least until the mid-nineteenth century and led to a considerable reduction in the extension of the habitat of alpacas and llamas.[12] Sheep and cattle became numerous on higher valley slopes and puna regions throughout the central Andes between Quito and Potosí, but the greatest numbers were to be found precisely in the areas of the greatest concentration of cameloids, the Titicaca basin.[13] The early colonial history of livestock raising in the Peruvian Sierra has not been analyzed thoroughly to date. It would seem, however, that the few very large herds known to belong to the one or the other Spanish encomendero remained exceptional. By the last third of the sixteenth century Spanish owners of middling estancias as well as Indian community peasants and their *kurakas* were the preponderant livestock holders in Peru.[14]

II. The Structure of Livestock Production During the Late Colonial Period

Who were the ranchers in late colonial New Spain and Peru and what was the size of their holdings? In Mexico, creole and peninsular hacendados as well as religious institutions dominated livestock raising. While Indian peasants and their communities as well as mestizo *rancheros* also owned cattle, sheep and mules, in most regions of the viceroyalty they contributed little to the market for livestock and livestock products. Gibson reports that Indian peasants in the valley of Mexico showed no great inclination towards cattle raising and even the *carnicerías* in the Indian towns were supplied with steers from Spanish hacendados.[15] According to the same author, of all large domesticated animals it was sheep which found most acceptance among Indians in the valley. Gibson estimated herds of Indian peasants to range from a few hundred to a few thousand sheep, with *caciques* owning up to 8,000 sheep.[16] Yet while he acknowledges that even these herds "were small in comparison with the large Spanish herds," still they must have been exceptional. Had most Indian peasants in the basins of Mexico and Puebla owned herds of a few hundred to a few thousand animals, they would have been a

considerable factor in the market for sheep and wool and a serious competition for Spanish hacendados, for which we have no evidence.

In the Intendancy of Nueva Galicia, Indian peasants owned small herds of cattle (usually less than ten) and sheep (no more than a few dozen) which provided draft animals, meat, hides and wool for their domestic economy. Only rarely did they market live animals or their products, and if they did, they commissioned owners of large herds about to be driven to market to sell their animals for them.[17] Here *cofradías* held the most important herds of Indian cattle and at times even participated in the long distance cattle drives.[18]

In the southern Mexican Intendancy of Oaxaca, Indian commoners held little livestock other than a yoke of oxen in the late colonial period, while sheep and cattle formed the main income of many Indian *cofradías* here just as in Guadalajara.[19] In contrast to central Mexico, *caciques* here maintained a prominant position in the regional livestock complex, as many were able to cling to extensive landholdings until the very end of the colonial period, at times even larger than Spanish pivate and church haciendas.[20] While the estates of convents and orders were nearly exclusively dedicated to livestock raising, private Spanish haciendas followed a mixed farming regime in Oaxaca. But, in any case, livestock herds of church institutions, Spanish hacendados and *caciques* remained relatively small in this southern Intendancy, rarely exceeding 10,000 sheep and 2,000 head of cattle and equines.[21] This size distribution of livestock herds stands in contrast to the situation in the major ranching areas of central and northern Mexico. While recent research has corrected the concept of a general dominance of large estates in the agrarian structure of eighteenth century New Spain, small haciendas, *ranchos* and *laborío*s seem to have played a much greater role for cereal production than for livestock raising. It is, of course, a simplification to speak of livestock estates or maize and wheat growing estates, since typically haciendas pursued a mixed farming economy with a great variety of possible product mixes. To be sure, on those estates which raised livestock merely as a supplementary product, or just for interior use as draft and transport animals and for meat provisions of the *peones*, herds might only hold a few hundred heads of cattle, as well as a similar number of goats and sheep. But among those haciendas whose primary income potential consisted of livestock, very large units dominated. This was not only true for northern Mexico, where haciendas with over 100,000 sheep, as Santa Catarina in Durango, or the Conde de Aguayo's vast latifundium centered at Patos in Coahuila seem not to

have been rare by the second half of the eighteenth century.[22] While these complexes had already been put together by the mid-eighteenth century, it is presently not clear whether there was a general trend towards the agglomeration of vast livestock latifundia in northern Mexico precisely during the last five decades of the colonial era, as suggested by the case of the Sánchez Navarro in Coahuila described by Charles Harris.[23]

Also in central and western Mexico large production units dominated the livestock raising industry during the late eighteenth century. This was true of the sheep and goat haciendas of the Jesuit Colegios of Mexico and Puebla. Their famous hacienda complex Santa Lucia, located north of Texcoco, held 128,000 sheep in 1744, with a declining livestock population during the last two decades before the order's expulsion. During these decades it marketed between 5,000 and 20,000 sheep annually besides considerable quantities of wool and tallow.[24] As far south as the Mixteca Baja, the Puebla Colegio owned two sheep raising haciendas with livestock capital of about 16,000 and 35,000 heads respectively during the 1760's and a goat ranch near Acatlan with also about 35,000 animals.[25] For northern Guanajuato and Aguascalientes we have references to privately owned estates with a livestock capital of about 100,000 sheep during the eighteenth century.[26] The large cattle ranches in the Intendancy of Nueva Galicia located in the Ameca valley and in the vicinity of Tepic on the Pacific slopes, seem to have held between 5,000 and 25,000 cows, steers and bulls during the late eighteenth century and were capable of marketing up to 3,000 or 4,000 steers annually.[27] While the average livestock hacienda in eighteenth century Mexico of course held less livestock capital, there can be little doubt that such large production units held a predominant position in the commercialization of animals and their products. Serrera Contreras reports that four hacendado families contributed 37 percent of all licensed cattle exports from Nueva Galicia to Nueva España between 1761 and 1800 and that one hacienda, Cienega de Mata, accounted for over 57 percent of legally slaughtered ewes in the *partido* of Aguascalientes between 1767 and 1781.[28] According to Eric Van Young, one hacienda, San Clemente, supplied 32 percent of the steers for Guadalajara's *abasto de carne* in 1780/81, with an even higher concentracion in the supply of sheep.[29]

Both the social and size distribution of livestock units was clearly different in late colonial Peru. In the Sierra, the all important region for livestock raising in Peru during this period, Indian commoners,

kurakas, cofradías and, to a lesser extent, communities still held a very signigicant share, in some provinces even the majority, of the livestock capital. Magnus Mörner reports that in 1786 haciendas only held less than 37 percent of sheep in Cuzco's province of Calca, a region primarily dedicated to cereal production.[30] Detailed livestock statistics for the important livestock raising province of Azángaro in the Altiplano for the years immediately following Peru's independence (1825 - 1830) show an even stronger position of Indian peasants as owners of livestock: Here they held nearly 60 percent of all sheep and nearly 70 percent of cattle, with the rest belonging to haciendas of creoles, *kurakas*, church institutions and the one or the other corporate community.[31] While Indian peasants probably held a relatively great share of the livestock population throughout southern Peru, it is quite possible that it was declining as one proceeded further north to provinces as Cajatambo, Huamachuco and Cajamarca, since it appears that even by the late eighteenth century the Indian communal tradition and Indian landholding was considerably weaker in the north than in the south.

It may be that the same geographical differentiation also obtained regarding the *kurakas'* involvement in livestock raising. At least for the southern and central Sierra we know that *kurakas mayores* belonged to the owners of the largest livestock haciendas. The *kuraka* family Astocuri Apoalaya, according to Olinda Celestino, was the largest landholder in the province of Jauja in central Peru, owning at least 27,000 sheep and 2,000 bovines as early as 1698.[32] The same can be said of *kuraka* Diego Choquehuanca of the Altiplano province of Azángaro who owned eleven livestock estates prior to the Túpac Amaru rebellion.[33] At least for certain areas of Andean Peru we also possess evidence for a considerable involvement of Indian *cofradías*, sometimes as stand - ins for communities, in livestock raising: According to Celestino, the ninety - five *cofradías* of Jauja province in 1795 held 21,531 head of sheep and 1,798 bovines.[34]

While it is beyond doubt that Indian peasants, *kurakas* and their institutions in Peru played a much grater role as livestock holders than in Mexico, the size distribution of Spanish estates in the Andes is more difficult to ascertain. In the most thourough analysis of a regional agrarian structure in late colonial Andean Peru published to date, Magnus Mörner reports that just after 1700 the largest Jesuit livestock estancia in the bishopric of Cuzco held 32,000 sheep and that a livestock estate in Canas y Canchis with 10,000 sheep and 100 cows had to be considered "muy grande." In that province, a good part of which had a

cold *puna* climate and specialized in livestock raising, no estate held more than 300 cows, admittedly the less important species of livestock compared with sheep.[35] The mean livestock capital of the 110 estates in Azángaro province immediately after Independence amounted to 1,155 sheep and forty-seven bovines.[36] Large haciendas here held between 5,000 and 10,000 head of livestock.

For the southern Peruvian Sierra there thus emerges a picture of a widely dispersed livestock property with a large share of small flocks controlled by Indian peasants, many livestock estates with only a few thousand sheep and several hundred head of cattle, and at best several dozen relatively large haciendas with 10,000 to 30,000 sheep.

It is possible however that a different structure prevailed in the center and particularly in the northern Peruvian Sierra, although the evidence is scarce. We have already mentioned the large livestock herds owned by the major *kurakas* of Jauja, and it appears as if the enormous livestock estates on the *punas* and high slopes of the Mantaro valley which became so prominent in the twentieth century, had reached a considerable size even by the late colonial period.

For the *corregimiento* of Huamachuco, in the Sierra and *ceja de la selva* of modern La Libertad and Cajamarca departments, Waldemar Espinoza has described a number of enormous estates for the late eighteenth century, which included lands in all climatic zones, from tropical to cold. They could thus produce considerable quantities of crops ranging from sugar, bananas and coca to maize and potatoes. But they also owned huge flocks of sheep with up to 100,000 animals, whose wool was processed in the estates' own *obrajes*. The largest of these estates, as San Pedro de Chuquisongo, Santa Cruz de Carabamba and Chusgón, extended for up to 1,940 square kilometers. Several belonged to the Augustinians in Lima.[37] In the global picture of late colonial livestock raising in Peru, the significance of these northern estates should not be exaggerated, however, since the largest concentration of stock was located in the southern highlands.

How can we account for this different social and size distribution of livestock production units both within and between the two viceroyalties? A tentative answer might lie in the interacting influence of regional ecological conditions, pre-hispanic land-use patterns and colonial demographic and settlement patterns on the process of hacienda formation and land distribution. In those areas in which the environment was well suited for livestock raising and where no sedentary Indian peasantry offered any resistance, one might naturally expect the swift entrenchment

of vast Spanish livestock estates, as happened in northern Mexico. But why did there develop such a marked difference in the average size of livestock estates between central Mexico and the southern Peruvian Sierra, both regions of dense population at the moment of conquest? The answer seems to rest in land-use patterns. In central Mexico the European livestock could spread rapidly because the declining indigenous population withdrew to its best agricultural lands, leaving wide areas which could be claimed as *sitios de ganado mayor* or *menor* by Spanish colonists. In the southern Peruvian highlands the very existence of large herds of alpacas and llamas belonging to the *ayllus* placed a limitation on the propagation of European livestock and hence, the possibility of Spaniards to claim pasture lands as estancias. Throughout the colonial period the continued importance of extensive livestock raising for much of southern Peru's Indian peasantry, even though marked by a gradual shift from cameloids to sheep and cattle, allowed them to maintain a strong legal claim and an effective control over much of the region's pasture land. Central Mexico's Indian peasantry appreciated this nexus between livestock raising and control over extensive stretches of land, as they attempted to build up communal herds precisely as a means to maintain control over what was becoming pastoral land.[38] The hypothesis is further supported by the fact that in the Andes even by the late eighteenth century the extension of the *mancha india* was practically identical with what may be called the *mancha cameloida* both stretching from Huancavelica southward through High Peru.[39] In other words, the survival of an Indian community peasantry was most marked precisely where the continuity of Indian livestock raising had been strongest. This would also help to explain the greater predominance of large livestock estates in the northern Peruvian Sierra. With the nearly complete displacement of cameloids from the region's *puna*, peasants became limited to temperate and tropical climate agriculture, while European sheep and cattle conquered the high elevation pastures for their masters.

III. Technology and Organization of Livestock Complexes

A striking difference among livestock operations in late colonial Mexico and Peru concerns the application of transhumance for sheep. In the northern viceroyalty hundreds of thousands of sheep and goats each year at the end of the rainy season in October and November were displaced from their estancias on the arid plateau to lower more humid winter pastures. From the valley of Mexico, from Querétaro and from

as far north as Durango ranchers moved their flocks over 300 or 400 kilometers to the area around Lake Chapala and western Michoacan where they paid pasturage fees on the estancias used only for seasonal occupation. At least during the seventeenth century several hundred thousand sheep from central Mexico were transferred north to Nuevo León and Coahuila at the beginning of the dry season to return southward in March. There were also important sheep displacements from the plateau to both the Gulf and Pacific coasts.[40] The prevalance of these long-distance sheep movements was one of the key factors explaining why, in all the Spanish Indies, only in Mexico it came to the establishment of the *mesta*, the ranchers' association, to whose regulatory powers it pertained to lay out sheepwalks or *cañadas* and try to minimize conflicts between the owners of the flocks and cattle herds driven to market and the owners of adjoining estates. Ursula Ewald puts the significance of this type of long distance transhumance in perspective, when she says that only such arduous, costly and risky transfers of animals between summer and winter pastures allowed the existence of large sheep and goat herds.[41] The combination of transhumance and long distance marketing also appears to have fostered specialization of New Spain's livestock economy, as the drive of cattle to dry season pastures was often associated with selling the animals to something like a "feed-lot operator," who fattened the young steers before sending them on to distant urban markets. Thomas Calvo has recently shown, how as early as the first third of the seventeenth century the seasonal cattle drives in Nueva Galicia were articulated through a complex chain of intermediaries and credit relations.[42]

In Peru transhumance was mostly local within one and the same landholding. Here the major way of dealing with seasonal scarcity or fodder consisted in the reservation of special pastures, so called *bofedales* or *ahijaderos*, with a peculiar vegation, which preserved moisture throughout the year, for feeding during the dry months. This regime was used in the sierra as much for sheep as for cattle.[43] While not totally absent, transhumance from the sierra to the piedmont and *lomas* on the Pacific side and to the *ceja de la selva* on the Eastern slopes of the Andes played a minor role.

Concerning the use of additional fodder besides natural pasture, here again one gains the impression that Mexican practices had become more complex than Peruvian ones. On the haciendas of central and western Mexico stubble grazing seems to have been commonplace.[44] The sowing of alfalfa fields as additional feed for cattle and equines seems to have

increased gradually during the eighteenth century, although New Spain's Jesuits showed great reluctance in this regard. The use of legumes and cereals as fodder found most application for mules and horses as well as for hogs during fattening. But at least the Jesuits also fed their cattle and even sheep with maize in times of scarce pastures.[45]

While there is some evidence for stubble grazing at least in the central region of the Peruvian sierra during the period under consideration, its use was very limited, both because only the viceroyalty's relatively small cattle herds profitted from it and because the major livestock herds were located in the *punas* quite far removed from the Andean valley bottoms dedicated to crop raising.[46] *Alfalfares* were planted in the more important Andean river valleys and throughout the coast. But again they only benefitted the cattle herds kept for raising draft animals, as well as mules, horses, and the animals being fattened for urban markets, particularly in the vicinity of Lima, as for example in the Chancay valley.[47] Among cereals and legumes in Peru, only barley attained any importance as forrage during the colonial period, but its use was limited to mules and horses.[48] In sum, Peru's major livestock populations, especially sheep, but also those cattle herds not specifically maintained to provide draft animals, for all practical purposes had to rely exclusively on natural pastures as fodder. This was certainy true for one of the most important Peruvian livestock regions, the Altiplano, even as late as around 1900.

What very well might be lurking behind the greater willingness of Mexican ranchers to experiment with additional forrages to supplement natural pastures was the growing pressure on pasture resources felt in many parts of central and southern Mexico during the late eighteenth century. According to Ursula Ewald, shortage of pastures perennially plagued the administrators of livestock haciendas belonging to the Jesuits' Colegio Espíritu Santo in Puebla.[49] Growing demographic pressure in areas as the valley of Mexico, the Bajío and central Nueva Galicia led to what David Brading has called internal colonization. New land was opened up for maize and wheat cultivation and hacendados undertook small irrigation projects. As Guadalajara's population tripled between 1760 and 1803, its foodshed, according to Eric Van Young, moved outward and cattle herds were displaced to more outlying, drier pastures. When in the latter part of the eighteenth century large livestock haciendas, as for example La Erre in Guanajuato, were rented in small parcels to tenant *rancheros*, these were likely to switch emphasis of production to crops.[50] These developments led to a scarcity of pasture for

livestock in central and southern Mexico and favored the growing use of additional fodder.

For late colonial Peru a tentative appraisal would suggest that in the Sierra, the major livestock producing zone, pastures were not becoming scarce yet. During the 1820's the livestock density on pastures in Azángaro province hovered around 1 to 1.5 units of sheep *(ovejas madres en reducción)* per hectare, with an estimated carrying capacity of about 2 units of sheep per hectare.[51] With population growth just having set in since the second third of the eighteenth century – as compared to New Spain, where this process had been under way since the mid – seventeenth century –, there is also not much evidence for "internal colonization," or any significant effort to extend acreage for crops.[52] In any case, since Peru's major livestock populations were located in the cold climate puna regions, herds and crops often did not compete for the same land.

Besides competing demands on land resources for food and cash crop production, the other factor influencing the relative scarcity or abundance of pastures or, put more generally, livestock density, was of course the development of the size of livestock populations. Data on this problem are fragmentary at best for both viceroyalties. Several scholars coincide in suggesting declining livestock populations, particularly of cattle on private estates in Nueva Galicia and Oaxaca, as well as on haciendas of the Jesuit Colegios of Mexico and Puebla since the mid – eighteenth century. Only herds of draft animals were increasing, responding to the growing food crop production.[53] Indeed it appears that in the more densely populated areas of central, western and southern Mexico the declining size of cattle populations was a direct consequence of the shrinking land resources allotted to pasturage. In the words of Guadalajara's wealthy miner and hacendado Manuel Calixto Cañedo, "...expanding the tillage restricts the livestock dangerously..."[54] In those parts of Mexico which felt the pressure of a growing population on food production, livestock populations by the mid – eighteenth century apparently were fully exploiting the carrying capacity of available pastures. Any reduction in the size of pastures thus automatically needed to be accompanied by reductions in the size of the herds. This consequence could only have been averted through greater investments in animal husbandry with the aim of achieving higher levels of productivity (increased carrying capacity of pastures, fencing, reduction of livestock mortality). But, as we have seen, internal colonization and capital improvement projects were increasingly chanelled away from livestock

raising into the production of wheat, maize and cash crops as *maguey*. The long-term decline in the reproductive rate of sheep, and possibly cattle, reported by Konrad for Santa Lucia during the eighteenth century, may well have been a consequence of overgrazing due to shortages of pasture while at the same time contributing to the stagnation in the size of herds.[55] Only in the less densely settled areas was it still possible to achieve increased production both of crops and livestock simultaneously.[56]

We may thus ask whether the balance of New Spain's livestock herds shifted icreasingly towards the northern plains during the late colonial period. For the early and mid-eighteenth century this seems likely, at least as far as sheep are concerned. The expansion of wool processing in Querétaro's *obrajes* during this period, coinciding with a marked decline of the more southerly earlier manufacturing centers, can be viewed as adaptation to the growing importance of the northern plains as source of raw wool, as Richard Salvucci has suggested.[57] Yet, if Harris' data on the Sánchez Navarro's livestock operations in Coahuila are representative at all for the northeast, one would have to conclude, that herds there also stagnated since the 1780's. Since the last years of that decade, the Sánchez Navarro's annual lambing crop reached a plateau not to be surpassed before the 1840's. In Nuevo León, Coahuila and Chihuahua a further buildup of herds may have been hampered since the 1770's by the increasing intensity and frequency of Apache raids and a spell of particularly severe droughts (1774-77, 1784-85, 1790 and 1798-1802).[58] For nearly all regions of New Spain impressionistic evidence points to a stagnation or, in some areas, even a decline of livestock populations since the 1780's, with the one exception of draft animals.

For Peru we also have circumstantial evidence to suggest declining livestock populations at least in the southern Sierra region since 1780. Inspite of Magnus Mörner's warning not to exaggerate the economic damage caused by the Túpac Amaru rebellion, I would like to insist on its great impact at least as far as livestock populations are concerned.[59] There are too many scattered reports about large numbers of sheep and cattle requisitioned by troops on both sides, plundering of estates and surreptitious sales in cities.[60]

While livestock populations naturally could recover quite fast within a decade or two after such a major depletion, it is my impression that this did not occur between the 1780's and the outbreak of the Wars of Independence in the southern Peruvian sierra for reasons connected to

the depressed market conditions, particularly for sheep. Rather than build up their stocks, hacendados preferred to sell as much as the annual crop allowed on the level of the reduced herds, in order to maintain a standard of consumption which could underwrite their social status.

Production techniques, at least as far as the better documented sheep ranches were concerned, seem to have been similar in both viceroyalties, although the Mexican livestock haciendas tended to be better equipped and evidenced greater care in the execution of major tasks in the annual production cycle, such as lambing, shearing and slaughtering. Sheds, special *corrales* for lambing ewes, copper kettles and other costly equipment for processing the tallow from slaughtered animals, while apparently common in Mexico, were not used in Peru. A meticulous regime of flocks, separated according to age and sex, was conventional practice in Mexican sheep ranches, but in the southern Peruvian sierra had been adopted only on Jesuit estancias.[61] Inspite of such differences, the scant information on productivity of sheep raising enterprises would suggest similarly low levels for both viceroyalties.[62] A telling example for the relative backwardness of cattle raising in late colonial Peru appeared in an article in the "Mercurio Peruano" in 1792. A citizen of Ica, concerned about the scarcity of beef in that town, suggested as an utter novelty that instead of slaughtering cows as practiced heretofore, from now on only steers should be slaughtered so that the region's stock might increase.[63] In Mexico, on the other hand, the exclusive use of steers for meat production had been commonplace since the late sixteenth century, when it was sanctioned by a viceregal ordinance.[64]

In sum, while ranchers in both viceroyalties used the same type of traditional production technology, Mexican livestock estates tended to be organized more effectively and probably were also more highly capitalized.

IV. The Structure of Markets and Conjunctures

With regard to livestock and their products the structure of the late colonial market in Mexico had become highly integrated and complex. Livestock producers from the most distant regions participated in the supply of centers of consumption up to 500 or 600 miles away. The Mexican livestock market had become sufficiently complex for producers to have choices as to which center of consumption presented the most lucrative conditions for sale at any given moment. Cattle producers from Nueva Galicia not only could choose whether they wanted to sell their

steers directly to merchants in Mexico or Puebla holding a contract for those cities' *abasto de carne* or try their luck at one of the annual livestock fairs in Puebla, Tlaxcala or Toluca. Increasingly they also compared the benefits derived from a difficult cattle drive to central Mexico with the conditions prevailing on Guadalajara's own urban market.[65] Coahuilan sheep ranchers as the Sánchezz Navarros could choose between selling their animals to livestock traders as those in San Miguel Allende or directly to the merchants holding Mexico City's *abasto de carne*.[66]

The Peruvian market for livestock products appeared much less integrated. Rather it mostly consisted in a series of isolated relations between one production zone with one center of consumption, usually not more than 100 kilometers distant from each other. This pattern characterized the supply of urban centers on the coast with sheep, hogs and, to a much smaller extent, cattle for meat consumption, as well as the supply of coastal estates with draft animals from livestock raising zones in the adjoining area of the sierra. Highland wool production was processed mostly in local *obrajes* to be found in nearly every *serrano partido* with sizeable sheep flocks between Cajamarca and the Titicaca basin.

Carlos Sempat Assadourian has recently presented a complex model of the "Peruvian space" during the early seventeenth century, in which he posits the precarious integration of a vast region stretching from the Kingdom of Quito to Tucumán, Chile and even Buenos Aires through commercial flows primarily set in motion by the secular expansion of silver production. Clearly Sempat comes to rather different conclusions about the Peruvian market for livestock products during the early seventeenth century than we do for that of the late eighteenth century. He stresses the importance of the long distance trade in tallow and cordobans from Piura and Chile to Lima as well as to Alto Peru's mining centers via Arica, the remittances of leather from Tucumán to Potosi and the large – scale distribution of mules from various parts of the River Plate region throughout Upper and Lower Peru.[67]

Principally two reasons allow us to hold a rather different view of Peru's livestock markets 150 years later. In the first place, Sempat himself stresses that between the late seventeenth and the nineteenth centuries both internal and external processes lead to a desintegration of the "Peruvian space" and the growing escision of vast regions on its rim that gradually reoriented their commercial flows to centers outside of its space. This desintegration was caused first by the crisis of Upper Peru's

silver mining production and, in the course of the eighteenth century, the growing strength of the Atlantic economy, and the pursuant separation of the viceroyalties of Nueva Granada and Rio de la Plata from Peru, a desintegrating process which culminated in the rise of subnational export economies during the nineteenth century. By the late eighteenth century Chile, although still being tied to the commercial circuit dominated by Lima's merchants, had ceased to be a major supplier of livestock products for Peru. The remittances of mules to Upper and Lower Peru from Córdoba and Tucumán via Salta were recovering by the 1790's after a protracted crisis during the mid – eighteenth century. Yet the export of hides, tallow and salted meat from Buenos Aires gained increasing importance for livestock producers even in some of the interior provinces of the Viceroyalty of Buenos Aires.[68] At least since its administrative separation from Peru the River Plate formed a distinct economic center of gravity outside the "Peruvian space." In as much as it had pulled Upper Peru into its own network of market relations, it even contributed to the weakening of commodity flows between that old center of silver production and the southern intendancies of Peru. These shifts had a particularly debilitating impact on the commercial circuits for livestock and livestock products, since they had constituted such a conspicious part of the commodity flows on the axis Lima – Potosí – Buenos Aires.

The second reason for viewing Peru's livestock market as less integrated during the late colonial period than Sempat does for the early seventeenth century rests on the following argument: Long distance trade in livestock and derivated products was only directed towards a few large centers, primarily Lima and the Upper Peruvian mining districts. But most regions and smaller provincial towns were supplied with meat, tallow, hides and wool from nearby livestock growing regions. With not much evidence for agricultural colonization in late colonial Peru, there is correspondingly also no indication that livestock herds were removed to more isolated, less densely populated regions. In contrast to late colonial New Spain, then, livestock raising remained a rather dispersed economic activity in Peru, with short supply lines to most urban markets. The major exception to this predominance of a rather localized pattern of commercialization concerned the mule trade from Tucumán. It was the only branch of the Peruvian livestock business the size and complexity of which surpassed the corresponding Mexican trade in the late colonial period.[69]

As for many other aspects, our information on the size of the Peruvian market for livestock products is very limited until now. If we are to believe statistics from the Mercurio Peruano for 1791, which easily might be inflated, the northern Altiplano marketed the largest number of sheep, with 120,000 head being sold in the Intendancy of Cuzco, and at least 100,000 head in the Intendancy of Arequipa, besides large amounts of *chalonas* (dried sheep carcasses), as well as considerable quantities of wool, tallow and other livestock products.[70] Some of the other livestock trade routes with relatively high volumes of transactions concerned the supply of Lima with 80,000 sheep annually from the Intendancy of Tarma, and the sale of up to 100,000 goats from Piura for the production of soap and cordobans in Lambayeque.[71] The least developed segment of the viceroyalty's livestock trade concerned cattle, as urban beef consumption was minimal and the demand for draft animals remained largely limited to a few hundred coastal and hardly any more highland haciendas, while most of the indigenous peasantry continued to cultivate their land with a digging stick.[72]

In Mexico, on the other hand, the cattle trade had a large volume, since urban beef consumption was considerable and there existed a great demand for for draft animals not only from the estate sector but also from the peasantry in central and southern Mexico. As Horst Pietschmann has shown, in a region like Puebla, the sale of cattle contributed the major share of the *corregidores' repartos de bienes* to Indian peasants.[73]

Two factors probably played a crucial role in accounting for the different structure of the market for livestock products in New Spain and Peru: 1. the demographic structure and the scale of urban centers and 2. transport and transaction costs.

By the late eighteenth century New Spain's central and western regions, from the basins of Puebla, Tlaxcala and Mexico to the Bajío and central Jalisco, contained extended areas with a rapidly growing population density. As we have seen earlier, this development lead to a switch from livestock production to crop agriculture. Consequently ranching activities moved to more outlying areas. This tendency towards the separation and distancing of densely populated crop growing regions and livestock raising complexes must have expanded the marketing network for livestock products and created additional demand for draft animals, tallow, hides, etc. in the crop growing regions which could not be met locally any more. At the same time, concomitant to the increas-

ing population density, quite a few cities were growing at a fast rate during the late eighteenth century.[74] By the 1790's there were six cities with more than 10,000 inhabitants within a radius of 300 kilometers from Mexico City and at least another nine cities of this size further distant from the capital. Together they offerred urban markets amounting to more than 400,000 people, of which 270,000 belonged to the cities within the 300 kilometers radius around Mexico City (including the capital's population itself). This represented, for the eighteenth century, a large aggregation of urban demand which favored an extension of trade networks for wool, tallow, live animals and hides and required a complex commercial structure.

In Peru, on the other hand, with a much lower population density than New Spain (obviously excepting the *provincias internas*), during the late eighteenth century no comparable agglomeration of urban demand existed. The eight or nine cities with more than 10,000 inhabitants (four more, if we include Alto Peru) were dispersed widely throughout the whole viceroyalty. The city of this size nearest to Lima (with the possible exception of the mining camp Cerro de Pasco) was Huamanga, at a distance of nearly 600 kilometers from the capital while the second and the third largest cities of the viceroyalty, Cuzco and Arequipa, lay more than 1,000 kilometers from Lima. Mexican secondary cities also tended to be considerably larger than those of Peru.

The second factor helping to explain the difference of the market structure for livestock products between the two viceroyalties concerns transport costs.[75] To be sure, roads were bad in both New Spain and Peru. Transport consequently could add enormously to the final price of a product in the market place. Yet there is good reason to think that this problem was graver in the Andean region than in Mexico, a distinction suggested by the very physical geography of both regions. One bit of evidence for this assertion comes from the difference in the price of livestock products between areas of production and centers of consumption. Eric Van Young reports that during the second half of the eighteenth century live cattle driven from central Jalisco to Mexico City, a distance of some 600 kilometers, was sold on the average for about twice the price to wholesalers in that city which it was worth in the producing region.[76] For live sheep the price differential between producing regions as far north as Coahuila and central Mexican markets may have been even smaller.[77] In Peru the difference in the price of sheep between a major producing area as the Altiplano and the Lima market could apparently reach 200 percent.[78] As late as the 1860's the price of wool

doubled between the production zone in the northern Altiplano and the wholesale warehouses in Arequipa, a distance of some 350 kilometers.[79] – Mules appear to have been considerably cheaper in New Spain than in Peru during the late colonial period, a factor which necessarily had a direct impact on transport prices for all types of merchandise, including livestock products.[80]

Although these varying prices and price – differentials are only drawn from scattered and unsystematic price data and need to be interpreted cautiously, they are very suggestive. With transport costs likely to have been considerably higher in Peru than in New Spain, the integration of the market for livestock products and, for that matter, all other merchandise as well, must have been much more tenuous in the Andean region than in the northern viceroyalty. Due to higher transport costs the radius beyond which rural products such as wool, tallow, hides, etc. became prohibitively expensive must have been smaller in Peru than in New Spain. Only those goods which could be shipped by sea, as for example tallow from Peru's north coast, would have escaped this dilemma.

Before concluding this comparison, let us briefly consider the conjuncture for livestock products in the two viceroyalties during the late colonial period. Again the Mexican case has been studied much better than that of Peru. In New Spain the long term constellation shaping the price development for many livestock products during the last fifty or sixty years of the colonial era consisted in the scissor – like cleavage between stagnating or declining livestock populations and simultaneously growing demand for some key products, caused by increasing urban and rural populations, greater use of draft animals in agriculture and the growth in the physical output of mines. All authors coincide that prices for live cattle and beef were rising no later than the 1760's in central and western Mexico.[81] Beef prices in Mexico City, undoubtedly the largest market for cattle as well as sheep to be found anywhere in Latin America during the eighteenth century, even rose steadily since the 1720's. The termination of the *repartos* by *corregidores* in 1786, which halted the sale of draft animals to peasants for a number of years, does not show up as a dip in the price of live cattle in the producing areas. For Oaxaca, Taylor reports essentially stable livestock prices throughout the eighteenth century with short – term upward and downward fluctuations.[82] There are some indications that sheep prices remained stationary somewhat longer than cattle prices. After a short inflationary movement during the drought years of the mid – 1780's, they remained depressed

in the Mexico City market until the mid – 1790's. During the last fifteen years until the outbreak of the insurgent movements, live sheep then brought rapidly rising prices in the Mexico City market. Scattered information on prices for raw wool also suggest a rise only since the last years of the eighteenth century.[83]

With the important exception of E.Tandeter's and N.Wachtel's recent study on prices in Potosí, we are still forced to make conjectures on the conjuncture for livestock products in late colonial Peru. The study on Potosí suggests rising meat prices (both for beef and *charqui*) between the 1720's and the mid – 1750's, followed by a long period of stagnation turning into decline between the early 1790's and 1804. The following decade saw a doubling of beef prices in Potosí. While the inflection of the price curve was upward for the three decades preceding 1755 and flat or downward during the second half of the century, the mean level of meat prices was twice as high between 1755 and 1790 as between 1721 and 1752.[84] The steep decline of cattle prices on Peru's central coast between the late seventeenth century and the 1740's, reported by Cushner, if it is not a quirk of a statistically too limited data base, might represent a prolongation of declining price trends observed for Potosí by Tandeter and Wachtel for the period between 1690 and 1721 and does not preclude the possibilty of a price recovery on the coast during the following decades.[85]

With growing urban populations in cities as Lima, Arequipa and Cuzco, it is quite possible that beef prices staid at a high level during the last few decades of the century also in Lower Peru, as livestock populations declined. Evidence from Ica for the year 1792 indicates that not only the price of beef but also that of mutton was rising there.[86] But another market – of greater relative significance in Peru than in Mexico due to the predominance of sheep in that viceroyalty's livestock population – seemed to be collapsing since the 1780's: I am referring to the demand for wool. For just about every region for which we possess information, we hear of a decline in the production of woolens and hence a diminished demand for the raw material. There were multiple causes for this problem ranging from destruction of the installations, to the separation of Alto Peru from the viceroyalty and, most importantly, the growing amount of European textiles entering the colony. It was this last problem which in 1816 Abascal adduced as cause for the ruin of Peru's livestock estancias.[87]

Tandeter and Wachtel found a drastic decline in the price of woolen textiles shipped from Cuzco's *obrajes* to Potosi setting in as early as the

first decade of the eighteenth century, with a precarious stabilization between the 1740's and 1781, and a further slide in the following decade. The short – lived recovery during the renewed wars with great Britain, 1796 – 1804, was more pronounced for cotton textiles than for woolen *bayetas*.[88]

It is evident then that the secular trend of demand for livestock products did not only vary between the two viceroyalties, but also between different products. For live cattle and beef prices appear to have been considerably higher both in New Spain and in Peru towards the end of the eighteenth century than they had been fifty or a hundred years earlier. But while the Mexican case was characterized by rising prices during the last four decades of the century, in the Andes prices stagnated as early as the 1750's. This suggests a smaller price elasticity for live cattle and beef in late colonial Peru. We may wonder whether we are here encountering a reflection of the greater scarcity of circulating currency in late colonial Peru which forced major groups of consumers of cattle to alter their pattern of consumption and curtail investments in draft animals as early as the 1750's.

For the case of Peru it is also evident that the commercialization of sheep and wool suffered under declining prices and increasing volumes of textile imports from Europe throughout much of the eighteenth century. While it cannot be ruled out that rising wool and sheep prices in New Spain between 1794 and 1808 only represented a brief recovery due to disruptions of the transatlantic trade, it at least appears plausible that the Mexican market for sheep and wool withstood European competition better both due to rapid population growth and modernization in the strongest centers of *obraje* production (Querétaro and, possibly, San Miguel el Grande and Guadalajara). In one important aspect, however, the structure of livestock conjunctures showed no difference between both viceroyalties: They were much less affected by the short – term climatic cycles than agricultural products.[89]

What about the increasing silver production in Bajo Peru? Can we assume, as John Fisher has done, that it stimulated all other economic sectors, including livestock production?[90] To be sure the *partidos* immediately adjacent to the two most important mining centers with an increasing production, Cerro de Pasco and Hualgayoc, did experience an increasing demand for their livestock. It is interesting to note that in the case of the *partido* of Cajamarca growing demand for sheep and hogs in Hualgayoc led to a discontinuation of the *partido's* trade in these animals with the coastal city of Trujillo, in other words to a further

localization of the livestock trade. But booming silver production did not lead to increased demand for livestock products in other regions outside the immediately adjoining *partidos* either in Cerro de Pasco or in Hualgayoc.[91] The growth of mining also failed to lead to an increased *obraje* production and hence demand for wool even in the very Intendancy of Tarma. In short, the stimulus of the mining centers on Peru's livestock production remained very modest indeed.

Conclusion

Inspite of being ruled by the same colonial regime, and inspite of similar systems of social stratification and even comparable levels of technology, the livestock complexes of New Spain and Peru during the final phase of Spanish rule showed important differences concerning the social distribution of the factors of production (land and animals), the structure of commercialization, and the conjunctures for the main products. For the purposes of the comparison we may have overdrawn these differences, but on the limited and uneven basis of presently available data, they appear no less real at that.

Broadly speaking, the Mexican livestock business was characterized by larger units of production dominated by private and corporate Spanish owners, in contrast to a more even distribution of livestock capital in the most important ranching areas of Peru, where Indian peasants and *kurakas* held a major share of cattle and sheep until after independence. The Mexican market for livestock products appeared more integrated and complex than that of the Peruvian viceroyalty, which in some respects appeared to be suffering a process of involution of its commercial circuits since the collapse of High Peru's early seventeenth century mining boom. While the commercial upswing of the Bourbon reform era is reflected in high price levels at least for cattle and derivated products in both viceroyalties, the growth in demand in the Andes could not be sustained since the 1750's. In any case, the conjuncture for sheep and wool, of greater relative importance for Peru than for New Spain, was deteriorating in the Andes throughout most of the eighteenth century.

We have sought explanations for these divergent structures and developments primarily in the different ecological and land – use patterns since pre – hispanic times, as well as in the impact of different demographic constellations and transport costs. These lines of arguments, it is hoped, have demonstrated the diagnostic value of changes in the livestock sector for broader developments in the viceregal economies. Conversely,

at least with regard to regional land tenure patterns, the crucial importance of different social distributions of the livestock capital to other subsystems of the economy is evident.

By the end of the colonial period, no later than 1783, to be precise, Peru's livestock industry had entered into a long – term crisis from which it was not to recover before about 1860. The Mexican case is more puzzling. While demand for livestock products grew right up to the outbreak of the struggle for independence, the producers seem to have failed to increase output correspondingly. The stagnation of livestock populations suggests that New Spain's ranchers were enjoying the strengthening conjuncture without reinvesting their growing returns. By the first decade of the nineteenth century, the seeds for the post – colonial decline thus also seems to have been laid for Mexico's livestock industry.

NOTES

1. Enrique Florescano and Isabel Gil, eds., *Descripciones económicas generales de Nueva España, 1784 – 1817. Fuentes para la historia económica de México,* 2 vols.(México, D.F., 1973), I:261.
2. D.J. Fox, "Mexico," in Harold Blakemore and Clifford Smith, eds., *Latin America, Geographical Perspectives* (London, 1971), pp.31 – 36 and 45 – 46; Nathan L. Whetten, *Rural Mexico* (Chicago, 1948), pp.3 – 20; François Chevalier, *Land and Society in Colonial Mexico, The Great Hacienda* (Berkeley, 1963), pp.8 – 15.
3. Clifford T. Smith, "The Central Andes," in Blakemore and Smith (eds.), *Latin America,* pp.263 – 275.
4. For the early history of livestock raising in New Spain see Chevalier, *Land and Society,* especially pp.84 – 114; William H. Dusenberry, *The Mexican Mesta, The Administration of Ranching in Colonial Mexico* (Urbana, Ill., 1963), passim; Alfred Crosby, Jr., *The Columbian Exchange, Biological and Cultural Consequences of 1492,* 2nd ed.(Westport, Conn., 1975),pp.82 – 83, 85 – 87, 92 – 93; José Miranda, "Notas sobre la introducción de la mesta en la Nueva España" in same author, *Vida colonial y albores de la independencia* (Mexico, 1972), pp.153 – 182; Richard J. Morrisey, "The Northward Expansion of Cattle Ranching in New Spain, 1550 – 1600," *AH,* 25(1951), 115 – 121; this author stresses the crucial role of livestock dispersion for the early Spanish control over vast territories in Mexico, as well as the new character of the livestock complex in colonial America; for an opposing view, stressing Spanish medieval continuities see Charles Bishko, "The Peninsular Background for Latin American Cattle Ranching," *HAHR,* 32(1952), 491 – 515; see also José Matesanz, "Introducción de la ganaderia en Nueva España, 1521 – 1535," *HM,* 14(1964 – 65), 533 – 566.

5. Chevalier, *Land and Society,* p.154; Donald Brand, "The Early History of the Range Cattle Industry in Northern Mexico", *AH,* 35 (1961), 134.
6. Chevalier, *Land and Society,* pp.102 - 104; Ramón Maria Serrera Contreras, *Guadalajara ganadera, estudio regional novohispano, 1760 - 1805,* Publicaciones de Escuela de Estudios Hispano - Americanos de Sevilla, No. CCXLI (Sevilla, 1977), pp.89 - 90; Dusenberry, *The Mexican Mesta,* p.134.
7. Charles Gibson, *The Aztecs Under Spanish Rule, a History of the Indians of the Valley of Mexico, 1519 - 1810* (Stanford, Ca., 1964), p.280; William B.Taylor, *Landlord and Peasant in Colonial Oaxaca* (Stanford, Ca., 1972), pp.15 - 16; Chevalier, *Land and Society,* pp.95 - 102.
8. Ibid., p.104 - 105; Dusenberry, *The Mexican Mesta,* pp.138 - 139.
9. Crosby, *The Columbian Exchange,* pp.91 - 94.
10. For llama herds on the coast during the prehispanic period see John V.Murra, *Formaciones económicas y políticas del mundo andino* (Lima, 1975), p.119; concerning coastal livestock raising during early colonial period see Robert G. Keith, *Conquest and Agrarian Change, The Emergence of the Hacienda System on the Peruvian Coast* (Cambridge, Mass., 1976), pp.56 - 64; Manuel Burga, *De la encomienda a la hacienda capitalista; el valle de Jequetepeque del siglo XVI al XX* (Lima, 1976), pp.89 - 96.
11. Ibid., p.113; Keith, *Conquest and Agrarian Change,* p.58.
12. As early as 1567 there was concern about an apparently rapid diminuition of cameloid herds; see Juan de Matienzo, *Gobierno del Perú (1567),* Travaux de l'Institut Français d'Etudes Andines, Tome XI (Paris, Lima, 1967), p.90.
13. By the mid - seventeenth century sheep and cattle were cheaper in the Collao than in any other part of Peruvian viceroalty; see Bernabé Cobo, *Historia del nuevo mundo,* ed. Marcos Jiménez de la Espada, 4 vols.(Sevilla, 1891), II:360 and 366.
14. Crosby, *The Columbian Exchange,* p.94; Keith, *Conquest and Agrarian Change,* p.58.
15. Gibson, *The Aztecs under Spanish Rule,* p.346.
16. Ibid., p.345; in the late colonial period Indian communities may at times have shifted from maintaining sheep herds on their communal land to renting it out to neighboring hacendados; see ibid., p.212.
17. Serrera Contreras, *Guadalajara ganadera,* p.324; Eric Van Young, *Hacienda and Market in Eighteenth Century Mexico, The Rural Economy of the Guadalajara Region, 1675 - 1820* (Berkeley, 1981), pp.202 and 287 - 289.
18. Serrera Contreras, *Guadalajara ganadera,* pp.349, pp.359 - 381.
19. Taylor, *Landlord and Peasant,* pp.81 - 82, 169.
20. Ibid., pp.47 and 65.
21. Ibid., pp. 47 and 129.
22. François Chevalier, "The North Mexican Hacienda: Eighteenth and Nineteenth Century," in Archibald R. Lewis and Thomas F. McGann, eds., *The New World Looks at its History* (Austin, 1963), p.98; Charles H. Harris III, *A Mexican Family Empire, The Latifundio of the Sánchez Navarros, 1756 - 1867* (Austin, 1975), pp.8 and 27.
23. Ibid., passim (esp. pp.3 - 27).
24. James Riley, *Hacendados jesuitas en México. El Colegio Máximo de San Pedro y San Pablo, 1685 - 1767* (Mexico, 1976), pp.190 - 196.

25. Ursula Ewald, *Estudios sobre la hacienda colonial en México, las propiedades rurales del Colegio Espíritu Santo en Puebla* (Wiesbaden, 1976), pp.121 - 124.
26. Examples are the "Hacienda de la Erre" of the Mariscales de Castilla near Dolores in Guanajuato; see David A. Brading, *Haciendas and Ranchos in the Mexican Bajío, León 1700 - 1860* (Cambridge, 1978), pp.32 - 32 and the Hacienda - Mayorazgo Cienega de Mata of the Rincón Gallardo family in Aguascalientes; see Serrera Contreras, *Guadalajara ganadera,* pp.314 - 315.
27. Van Young, *Hacienda and Market,* pp.202 - 210; Serrera Contreras, *Guadalajara ganadera,* pp. 121 - 141.
28. Ibid., pp.123 and 314 - 315.
29. Van Young, *Hacienda and Market,* p.49.
30. Magnus Mörner, "Continuidad y cambio en una provincia del Cuzco: Calca y Lares desde los años 1680 hasta los 1790," *HC,* 9(1975), 102; while the haciendas' share of cattle and equines was huge, their total number were rather small.
31. José Domingo Choquehuanca, *Ensayo de estadística completa de los ramos económico - políticos de la provincia de Azángaro en el departamento de Puno de la República Peruana, contados desde 1825 hasta 1829 inclusive* (Lima, 1833), pp.13 - 55.
32. Olinda Celestino, *La economía pastoral de las cofradías y el rol de la nobleza India: el valle del Mantaro en el siglo XVIII,* Universität Bielefeld, Universitätsschwerpunkt Lateinamerikaforschung, Arbeitspapier No. 25 (November 1981), pp.20 and 28.
33. Nils Jacobsen, "Landtenure and Society in the Peruvian Altiplano: Azángaro Province, 1770 - 1920", (Ph.D. Diss., University of California, Berkeley, 1982), chapter III.
34. Celestino, *La economía pastoral,* pp.30 - 33.
35. Magnus Mörner, *Perfil de la sociedad rural del Cuzco a fines de la colonia* (Lima, 1978), p.72.
36. Choquehuanca, *Ensayo de estadística,* pp.15 - 53.
37. Waldemar Espinoza Soriano, "Geografía histórica de Huamachuco," *HC,* 5 (1971), 37 - 54. The only two livestock estates existing in the cold climate province of Cajatambo, at the northwestern end of the Intendancy of Tarma, held the considerable capital of 30,000 and 10,000 sheep in the early 1790's; see J.C., "Descripción sucinta de la provincia ó partido de Cajatambo, en que se trata por incidencia de la decadencia de las minas y de las causas de la despobalión del reyno," *MP,* Tomo V, Nos. 162 and 163 (1792), 198.
38. Gibson, *The Aztecs under Spanish Rule,* p.540, note 33.
39. Celestino, *La economía pastoral,* p.8, affirms that in the Mantaro valley European livestock had replaced cameloids "casi en forma total" by the late eighteenth century. The central Peruvian sierra would present a somewhat difficult intermediate case in the correlation of Indian livestock holding and the extension of estates.
40. Dusenberry, *The Mexican Mesta,* pp.91 - 116; Serrera Contreras, *Guadalajara ganadera,* pp.291 - 296; Ewald, *Estudios,* pp.126 - 133.
41. Ibid., p.12; Herman Konrad, *A Jesuit Hacienda in Colonial Mexico, Santa Lucia, 1576 - 1767* (Stanford, 1980), p.85.

42. Thomas Calvo, "Le pré - capitalisme aux champs: un étrange seigneur de troupeaux mexicain," *CAL*, 24(1981), 167 - 183.
43. As example for the importance of *ahijaderos* for the economic operation of late colonial livestock estancias in the sierra see the appraisal of the former Jesuit estancia Llallagua, anexo Titiri in the *partido* of Azángaro in 1771, published in Pablo Macera, *Mapas coloniales de haciendas Cuzqueñas* (Lima, 1968), p.29.
44. Van Young, *Hacienda and Market*, p.222; Ewald, *Estudios*, p.147.
45. Ibid.; Van Young, *Hacienda and Market*, p.222.
46. Mariano Millan de Aguirre, "Descripción de la intendencia de Tarma," *MP*, Tomo VIII, Nos. 258 - 260 (1793), 128; Celestino, *La economia pastoral*, p.51.
47. Alonso Carrio de la Vandera, *El lazarillo de los ciegos caminantes* (1773), ed. Emilio Carillo (Barcelona, 1973), p.24; Pablo Macera, *Instrucciones para el manejo de las haciendas jesuitas del Perú (siglos XVII - XVIII)*, Nueva Cronica Vol. II, Fasc. 2 (Lima, 1966), p.34. Mörner, *Perfil de la sociedad rural*, p.73; Laureano Bedeybz(!), "Carta y rasgo remitados a la sociedad sobre el contenido del Mercurio numero 177," *MP*, Tomo VI, No. 206 (1792), 275; this letter concerns cattle raising in Ica.
48. Emilio Romero, *Perú: una nueva geografía*, 2 vols.(Lima, about 1972), II:221.
49. Ewald, *Estudios*, p.148.
50. Brading, *Haciendas and Ranchos*, pp.33 - 34, pp. 64 - 65; Van Young, *Hacienda and Market*, p.201; Konrad, *A Jesuit Hacienda*,, pp.88, 105 and 197 - 214 demonstrates the effects of both peasant resistance against extensions of estate pastures and shifting emphasis from livestock to food and cash crops for the stagnation and even decline of Santa Lucia's livestock operations since the mid - eighteenth century.
51. Jacobsen, "Landtenure and Society", Appendix II.
52. Only Jean Piel speaks for the late eighteenth century of a "véritable essor agricole lié a l'augmentation de la production, de la population et des échanges," essentially basing his judgement on evidence from one Indian community in the central sierra, Santa Lucia de Pacaros; see his *Capitalisme agraire au Pérou*, Vol.I.: *Originalité de la société agraire peruvienne au XIX siècle* (Paris, 1975), p.227.
53. Van Young, *Hacienda and Market*, pp.207 - 208; Sierra Contreras, *Guadalajara ganadera*, p.320; Taylor, *Landlord and Peasant*, p.16.
54. Van Young, *Hacienda and Market*, p.213.
55. Konrad, *A Jesuit Hacienda*, pp.181 - 182 and 196.
56. Claude Morin, "Sentido y alcance del siglo XVIII en América Latina: el caso del centro - oeste mexicano," in Enrique Florescano, ed., *Ensayos sobre el desarrollo económico de México y América Latina (1500 - 1975)*, (Mexico, 1979), p.161.
57. Richard Salvucci, "Industrial Organization and Economic Geography: The Textile Manufactories in New Spain, 1690 - 1810", paper presented at the conference on "Historia económica de Hispanoamérica a fines del período colonial: México y Perú, 1760 - 1810", Bielefeld, September 1982.
58. Harris, *A Mexican Family Empire*, pp.31 - 41.

59. For Mörner's critique see his *Perfil de la sociedad,* pp.126 – 128.
60. Jacobsen, "Landtenure and Society", Chapter III; in 1792 a correspondent from Ica reported that the scarcity of livestock brought to that town from the adjoining Sierra province of Castrovirreina had begun just twelve years ago, i.e. in 1780; see Bedeybz, "Carta y rasgo remitido", 275.
61. Harris, *A Mexican Family Empire,* pp.32 – 33; Ewald, *Estudios,* pp.129 – 133; "advertencias para que se gobiernan por ellas el mayordomo de estas estancias (Ayuni y Camara)...," September 26, 1702, in Macera, *Mapas coloniales,* pp.84 – 90.
62. Konrad, *A Jesuit Hacienda,* p.183, reports 1.74 pounds of wool per sheep annually during the first third of the eighteenth century; for the large estancia Chusgón, in the northern sierra, province of Huamachuco, Espinoza Soriano, "Geografía histórica," p.37, has found average wool production of 1.5 to 2 pounds annually per sheep for 1759; the mortality of lambs immediately after birth was extremely high in both viceroyalties; see Harris, *A Mexican Family Empire,* pp.33 ff; Macera, *Mapas coloniales,* p.76.
63. "Proyecto económico sobre el aumento del ganado vacuno," *MP,* Tomo VI, No. 177 (1792), 26 – 30.
64. Dusenberry, *The Mexican Mesta,* p.135.
65. Van Young, *Hacienda and Market,* pp.193 – 207; Serrera Contreras, *Guadalajara ganadera,* pp.95 – 96 and 104.
66. Harris, *A Mexican Family Empire,* pp.79 – 87.
67. Carlos Sempat Assadourian, *El sistema de la economía colonial; mercado interno, regiones y espacio económico* (Lima, 1982), pp.179 – 189.
68. Tulio Halperín Donghi, *Revolución y guerra; formación de una elite dirigente en la Argentina criolla* (Buenos Aires, 1972), pp.18 – 21.
69. For a comparative treatment of the mule trades between Guadalajara and Mexico and Salta and Lima, see Serrera Contreras, *Guadalajara ganadera,* pp.197 – 206.
70. Cephalio, "Dissertación histórica y política sobre el comercio del Perú," *MP,* Tomo I (1791), Tables 1 and 2, between pp. 228 – 229. Stock statistics for the three principal livestock raising provinces of the Intendancy of Puno between 1807 and the 1820's indicate sheep populations between 100,000 and 300,000 head per province, so that an annual extraction of at least 400,000 head suggested by the 1791 trade statistics seem much too high; see Jacobsen, "Landtenure and Society", Chapter III.
71. Millan de Aguirre, "Descripción", pp.113 and 137; Joseph Ignacio de Lequanda, "Descripción geográfica del partido de Piura," *MP,* Tomo VIII, Nos. 263 – 270 (1793), 225 – 226.
72. On Lima's extremely scarce consumption of beef during the 1740's see Jorge Juan and Antonio de Ulloa, *Relación histórica del viaje á la América meridional,* 2 vols.(Madrid, 1748 [reprint ed. Madrid, 1978]), II: 134.
73. Horst Pietschmann, "Der Repartimiento – Handel der Distriktsbeamten im Raum Puebla im 18. Jahrhundert", *JLA,* 10(1973), 236 – 250.
74. I am grateful to Guy Thomson for suggesting the importance of different scales of urbanization for the market structure to me; my argument here owes much to Eric van Young, who was the first to systematically analyze shifts in late colonial Mexico's agrarian production as a consequence of demographic developments.

75. I would like to thank John Coatsworth for pointing out the importance of transport and transaction costs for explaining different stuctures of markets for livestock products to me.
76. Van Young, *Hacienda and Market,* p.203.
77. Compare price quotations for the 1790's and early 1800's in Harris, *A Mexican Family Empire,* pp.81 - 87; Quirós, "Idea de la riqueza," pp.239 - 241; for sheep values on a Jesuit hacienda close to Mexico City in 1764 see Konrad, *A Jesuit Hacienda,* p.179.
78. Partido de Lampa de la provincia é Intendencia de la ciudad de Puno, estado que manifiesta en primer lugar el numero de pueblos y habitantes clasificados, y en segundo lugar los valores de todos los frutos, y efectos de agricultura, de industria y minerales que ha producido este partido en todo el año de 18 [sic!] distinguido por el numero peso ó medida de cada clase, Lampa, May 23, 1808, BNP, Sala de Investigaciones, Manuscript Collection; Tadeo Haenke, *Descripción del Perú,* (Lima, 1901), pp.18 - 19.
79. Jacobsen, "Landtenure and Society," p.112.
80. Quirós, "Idea de la riqueza", p.242 quotes a mean price of fifteen pesos for early nineteenth century New Spain; under the system of *repartos de bienes, corregidores* sold mules in Peru for twenty - five to sixty pesos between 1754 and 1783, depending on the distance from livestock raising centers; see Jürgen Golte, *Repartos y rebeliones, Túpac Amaru y las contradicciones de la economía colonial,* (Lima, 1980), p.87; even after the end of the *repartos,* in the mid - 1790's a *mula de calesa* in Lima still sold for sixty pesos; see Haenke, *Descripción,* pp.18 - 19.
81. Brading, *Haciendas and Ranchos,* pp.85 - 87; Van Young, *Hacienda and Market,* pp.45 - 49.
82. Brading, *Haciendas and Ranchos,* pp.86 - 87; van Young, *Hacienda and Market,* pp.45 - 48; Serrera Contreras, *Guadalajara ganadera,* pp.87 - 88; Taylor,*Landlord and Peasant,* pp.130 - 131; Harris, *A Mexican Family Empire,* pp.80 - 92; Maria Eugenia Romero and Erendira Villamar, "Producción y mercado: San José Acolman y Anexas, 1788 - 1798," in Enrique Semo, ed., *Siete ensayos sobre la hacienda mexicana, 1780 - 1880* (Mexico, 1977), p.168; on declining cattle sales to peasants after the abolition of *repartos,* see Pietschmann, "Repartimiento - Handel," p.241; on Mexico City as livestock market see Pedro Alonso O'Crouly, *A Description of the Kingdom of New Spain* (n.p.; 1972), p.30; Alejandro de Humboldt, *Ensayo político sobre el reino de la Nueva España,* Juan Ortega, ed.(Mexico,1966), pp.132 - 133.
83. Harris, *A Mexican Family Empire,* pp.82 - 90; Romero and Villamar, "Producción y mercado", p.168.
84. Enrique Tandeter and Nathan Wachtel, *Precios y producción agraria, Potosí y Charcas en el siglo XVIII* (Buenos Aires, 1983), pp.76, 82 - 83.
85. Nicolas Cushner, *Lords of the Land, Sugar, Wine and Jesuit Estates of Coastal Peru, 1600 - 1767* (Albany, 1980), p.72.
86. "Proyecto economico", p.27.
87. José Fernando de Abascal y Sousa, *Memoria de Gobierno,* 2 Vols.(Sevilla, 1944), I: 219; for regional reports of declining *obraje* production see Ignacio de Castro, "Relación del Cuzco," in *Colección documental de la independencia del Perú* Tomo II, *La rebelión de Túpac Amaru,* Vol. 1, *Antecedentes,* (Lima, 1971), p.213; Mörner, *Perfil de la sociedad,* pp.85 - 87; Millan de

Aguirre, "Descripción," pp.133 - 134; J.C., "Descripción sucinta de la provincia i partido de Caxatambo," *MP,* Tomo V, Nos. 162 - 163 (1792), 191; Espinoza, "Geografía histórica," p.7.

88. Tandeter and Wachtel, *Precios y producción,* pp.23 - 30; see also Brooke Larson's contribution on Cochabamba's cotton conjuncture during the 1790's in this volume; it would seem that the growing difficulties of the Huamanga *obrajes* in marketing their woolen textiles in Alto Peru since the 1770's, described by Miriam Salas in this volume, only represent the tail - end of the worsening long - term conjuncture.
89. Elias Trabulse, coordinator, *Fluctuaciones económicas en Oaxaca durante el siglo XVIII* (Mexico, 1979), p.47; Tandeter and Wachtel, *Precios y producción,* p.76.
90. See John Fisher's contribution to this volume; see also Carlos Sempat Assadourian, Heraclio Bonilla, Antonio Mitre and Tristan Platt, *Minería y espacio económico en los Andes, siglos XVI - XX* (Lima, 1980), pp.24 - 25.
91. Joseph Ignacio de Lequanda, "Descripción geográfica del partido de Caxamarca," *MP,* Tomo X, Nos. 333 - 338 (1794), 185, 192 and 210; Millan de Aguirre, "Descripción," pp.134 - 135.